



## HARDWARE

- Provides voice and data communications capability for NGEN™ workstations
- Integrated codec for voice digitization; uses ADPCM technology at 24 or 32 KbPS
- Integral modem is Bell 212-A compatible, and operates in asynchronous mode at 300 and 1200 baud
- Auto-dial capability for both voice and data connections, using DTMF and rotary signaling
- Auto-answer capability for both voice and data connections
- DTMF tone decoding permits numeric data entry via remote telephone touchpad
- Contains two FCC Part 68 modular jacks for attachment to common PABX and Central Office switching systems
- Works with ordinary telephone instruments
- Internal crosspoint matrix permits programmable switching of all system components
- Device driver supports Voice, Data, and Telephone functions
- Supported by The Operator™, Asynchronous Terminal Emulator, and CT-Mail™ Software

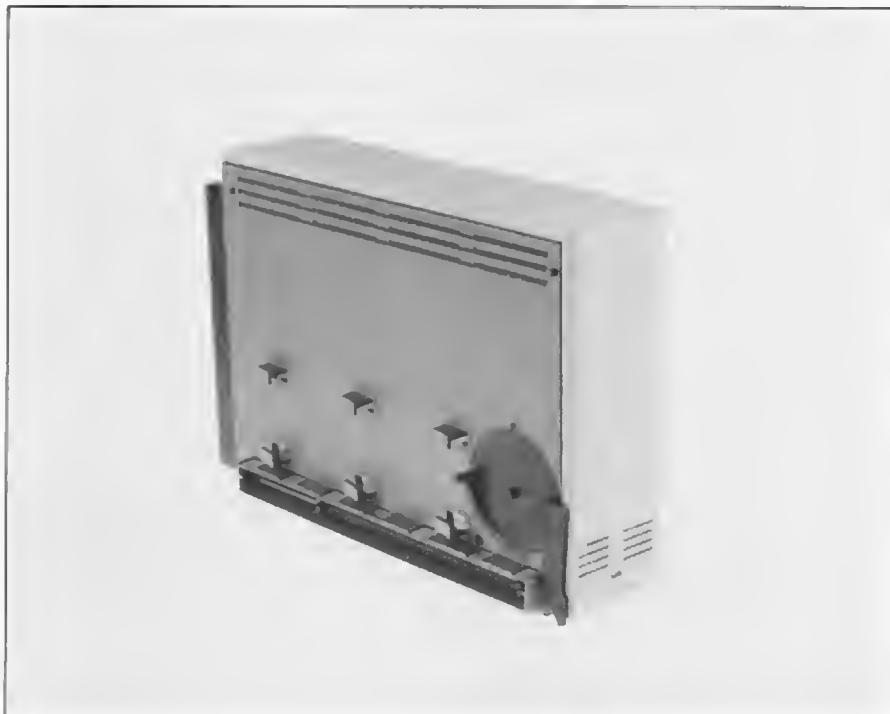
# CONVERGENT TECHNOLOGIES

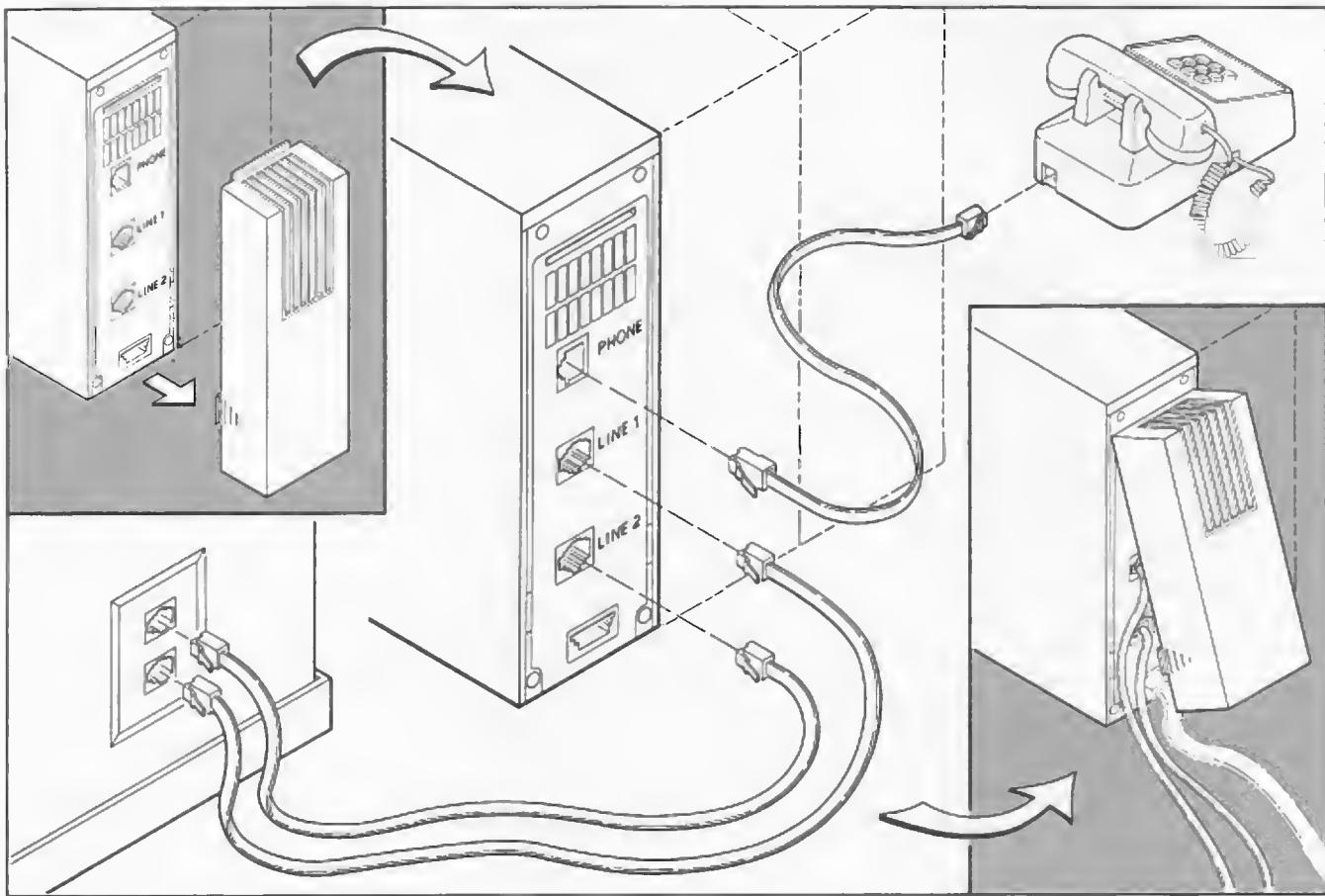
## Voice Processor™

The Voice Processor™ (TM-001) provides a flexible means of connecting NGEN™ workstations to both voice and data networks. It enhances the overall utility of the workstation by permitting voice input and output, as well as by providing easy to install interfaces to data communication networks.

The Voice Processor includes, in one small enclosure, a diverse set of communications-oriented hardware devices. The principal elements are a 300/1200 baud, Bell 212-A compatible modem; a 24/32 KbPS codec, using ADPCM technology for high voice quality at speeds far less than the normal 64 KbPS required using conventional PCM encoding; DTMF and rotary signaling devices for auto-dial capability with both electronic and electromechanical switching circuitry; a DTMF tone decoder for remote data entry via telephone touchpads; modular jacks for connection to both communications lines and telephone instruments; and a microprocessor controlled switching matrix that can connect the various elements together under software control.

The Voice Processor can be connected directly to the switched telephone network, or it can be used in conjunction with many popular PABX systems, supporting "Tip and Ring" interfaces, such as the AT&T Dimension® series, the Rolm CBX, and the Northern Telecom SL-1. When used with digital PABX systems, all signaling and transmission between the Voice Processor and the PABX occurs using analog techniques.





The **Integral modem** can be used in both originate and answer modes, and supports full duplex transmission, in asynchronous mode, over ordinary two-wire phone circuits. It is compatible with the Bell 212-A series in 1200 baud operation, as well as the Bell 103/113 series in 300 baud operation, and complies with CCITT Recommendation V.22. It uses bit encoded phase-shift keying for high speed operation, and frequency shift keying for low speed operation. The integral modem frees the RS-232 ports in the CP-001 Processor module for other applications.

The **Integrated codec** (COder/DECoder) uses the Adaptive Pulse Code Modulation (ADPCM) technique to digitize analog (voice) signals, and to convert digitized voice information back into analog form. Voice signals are sampled at a rate of either 8 KHz or 6 KHz, which generates encoded data at the rate of 32K or 24K bits per second, respectively. Software compression schemes can be used to reduce these rates by approximately 25%. The 8 KHz sampling rate provides the highest quality voice transmission, while the 6 KHz rate can reduce storage and transmission costs. The digital output of the codec may be stored on a local system disk, or may be transmitted, via the RS-422 cluster communications line, to a disk on a master workstation.

The Voice Processor hardware is capable of converting analog voice signals into a digital format, but makes no attempt to interpret the semantic content of the voice signals themselves.

The **DTMF Tone Generator** generates all sixteen DTMF digits (0-9, \*, #, A-D), under software control. It is normally used in auto-dial applications, where it sends the number to be called down the line, one digit at a time. It can also be programmed to transmit various key sequences to PABX units, to activate specific features of the switch. Call establishment can also be accomplished using pulse generation in areas using electromechanical switching equipment.

The **DTMF Tone Detector** can decode incoming DTMF tones, and present the DTMF digits they represent to an application software package. This feature is often used to input numeric information, via a telephone touchpad, to programs supporting voice mail or voice response capabilities.

Three modular jacks are mounted on the rear panel of the Voice Processor, under a removable cover. The jack labeled "phone" is used to connect a standard telephone instrument; this jack also provides power to operate speaker phones. The jacks labeled "line 1" and "line 2" are used to connect the Voice Processor to a



PABX switch or lines provided by a telephone company. Line 1 is normally used for voice communications; when the NGEN workstation is powered down, a normally closed relay connects the Line 1 jack to the phone jack, permitting manual operation of the telephone unit. Line 2 is normally used for data communication applications. It is possible, however, to use either line for voice or data, and either line can be used alternately in both modes.

All elements of the Voice Processor are controlled by a dedicated Intel 8051 microcontroller. All elements are connected to an internal switching matrix, which for example, allows either access line to be connected to the telephone unit, the modem, the codec, or the DTMF tone decoder.

The Voice Processor can be used in conjunction with most standard telephones.

### SOFTWARE

The Voice/Data Services (VDS) is the device driver for the Voice Processor, and simplifies the development of custom applications.

#### Voice Services

The voice services interface allows programs to use the codec features of the Voice Processor. The services available include voice record, playback, and stop functions. The VDS stores data on disk in 512 KB records. During recording, both hardware and software compaction algorithms are used to compress the data.

#### Data Services

The data services interface allows a program to use the integral modem in the Voice Processor module. The services available include opening and closing data lines, transferring data, confirming data transmission, and modifying or examining control parameters. These services can be invoked from user-written programs, and are also used by Convergent's Asynchronous Terminal Emulator program (ATE).

#### Telephone Services

The telephone services interface allows a program to control the Voice Processor module, and to connect the functional elements of the module in a variety of ways. The services include making connections, dialing out, decoding DTMF signals, and monitoring status information.

#### Office Automation

The optional CT-Mail™ Electronic Mail package supports the Voice Processor in two ways. Users can enter voice messages, which can be transmitted to one or more users on the network. Also, CT-Mail can use the modem in the Voice Processor to transmit messages to remote mail centers.

The Operator™, an optional end-user oriented application package for telephone management, is also available for NGEN workstations equipped with the Voice Processor. The Operator can manage telephone lists, place voice and/or data calls via the unit's auto-dial facility, and accept calls, taking voice messages as required.

**MODULE POWER REQUIREMENTS**

Module	Power Code
TM-001	1

**MODEM SPECIFICATIONS****Speed**

1200 baud, Full Duplex  
300 baud, Full Duplex

**Compatibility**

CCITT V.22, Alternative B  
Bell 212-A  
Bell 103/113

**Modulation**

High Speed: PSK  
Low Speed: FSK

**Operating Modes**

Originate/Answer  
Full Duplex  
Asynchronous Transmission

**Character Format**

1 Start Bit/8 Data Bits/1 Stop Bit

**VOICE OPERATION**

24 KbPS/6 KHz Sampling  
32 KbPS/8 KHz Sampling

**PHYSICAL**

Height: 8 in. (203.2 mm)  
Width: 2.52 in. (64 mm)  
Length: 12 in. (304.8 mm)  
Weight: 4.5 lbs (2.05 kg)

**ENVIRONMENTAL, SAFETY, AND REGULATORY****Altitude**

Operating: 15,000 feet ASL  
Non-Operating: 25,000 feet ASL

**Temperature**

Operating: 0°C to 40°C  
Non-Operating: -40°C to 75°C

**Humidity**

Operating: 5% to 95% RH  
Non-Operating: 90% RH at 65°C for 12 hours

**ESD**

5,000 Volts: No observable effect  
12,500 Volts: Errors corrected via Software Intervention  
17,500 Volts: Errors corrected via Operator Intervention  
25,000 Volts: No permanent damage

**Safety**

Meets UL 478 (EDP) and 114 (Office Equipment)  
Meets CSA 154 (EDP) and 143 (Office Equipment)

**Emissions**

Meets FCC Part 15, Sub-Part J for Class A Emissions

**Telephony**

Registered for direct connection to the Public Telephone Network, under Part 68 of the FCC Rules.

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